ON THE

COMMERCIAL IMPORTANCE OF HUDSON'S BAY,

WITH

REMARKS ON RECENT SURVEYS AND INVESTIGATIONS.

By Robert Bell, M.D., F.G.S., Assistant Director of the Geological Survey of Canada.

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Map, p. 640.

I beg leave to offer to the Royal Geographical Society a few remarks on the great Mediterranean sea of North America, in regard to which there appears to be a general want of correct information. Before proceeding to do so, it may be proper for me to state that I have a considerable personal knowledge of Hudson's Bay and the surrounding regions. As an officer of the Geological Survey of Canada, I have spent six seasons since 1869 in explorations around the bay itself or in its vicinity, while the remaining summers of this interval have been devoted mostly to surveying and exploring portions of the Hudson's Bay territory at greater or less distances inland. In the course of my geological investigations, I have made surveys of most of the principal rivers, together with their larger branches, which flow from the west and south into Hudson's Bay, including the Great and Little Churchill, the Nelson, Hayes, Hill, Severn, Albany, Kenogami, Moose, Missinabe, Mattagami, and Abittibi. On account of its great geological interest, I made a topographical survey in 1877 of about 300 miles of the Eastmain Coast, from Cape Jones northward. Some of the maps showing these surveys have been already published with the annual reports of the Geological Department, and those representing the remainder will soon be forthcoming.

During the past autumn, in coming to England in one of the ships from the bay, I happened to enjoy unusually good opportunities of seeing both sides of Hudson's Strait, and of acquiring much valuable information in reference to its navigation.

In the popular mind, Hudson's Bay is apt to be associated with the polar regions, yet no part of it comes within the Arctic circle, and the

southern extremity is south of the latitude of London. Few people have any adequate conception of the extent of this great American sea. Including its southern prolongation, James' Bay, it measures about 1000 miles in length, and it is more than 600 miles in width at its northern part. Its total area is approximately 500,000 square miles, or upwards of half that of the Mediterranean Sea of the old world. It is enclosed by the land on all sides except the north-east, where it communicates by several channels with the outer ocean. The principal or best known of these is Hudson's Strait, which is about 500 miles in length, and has an average width of about 100 miles.

Hudson's Bay, which might have been more appropriately called Hudson's Sea, is the central basin of the drainage of North America. The limits of this basin extend to the centre of the Labrador peninsula, or some 500 miles inland on the east side, and to the Rocky Mountains, or a distance of 1300 miles on the west. The Winnipeg Basin constitutes a sort of outlier of the region more immediately under notice, since the waters drain into it from north, south, east, and west, and discharge themselves by one great trunk, the Nelson river, into Hudson's Bay. The southernmost part of this basin, namely, the source of the Red River, extends down nearly to latitude 45°. The head waters of the southern rivers of James' Bay are not far to the north of Lake Huron; while one of the branches of the Albany rises within 25 miles of the north shore of Lake Superior. Including the Winnipeg system, the basin of Hudson's Bay has a width of about 2100 miles from east to west, and a length of about 1500 miles from north to south, and its dimensions approach the enormous area of 3,000,000 square miles. Over a great part of this vast region there is a temperate climate, and although much of the surface is comparatively barren, yet large tracts possess a very fertile soil. The numerous large rivers and lakes embraced within these limits will prove of great value in the settlement of the country.

Both the bay and strait are remarkably free from rocks and shoals, which might interfere with their free navigation. The groups of islands near the east side of the bay are surrounded by deep water, and a wide channel leads up the centre of James' Bay. Fortunately the main body of the bay, which is the portion likely to be hereafter frequented by shipping, is entirely without shoals, reefs, or islands. The depth is very uniform over most of the bay, and nowhere does it present any great irregularities. It averages about 70 fathoms throughout, deepening to 100 and upwards in approaching the outlet of Hudson's Strait; while in the strait itself the soundings along the centre vary from about 150 to upwards of 300 fathoms. The bottom appears to consist almost everywhere of boulder clay and mud. Near the shores a stiff clay, affording good holding ground for anchors, is almost invariably met with on both sides.

James' Bay begins at Cape Jones on the east side and Cape Henrietta

Maria on the west, and runs south about 350 miles, with an average breadth of about 150 miles. The east side of Hudson's Bay, including its southern prolongation, is known as the Eastmain Coast. Between Cape Jones and Cape Dufferin on the Portland Promontory, and again in approaching Cape Wolstenholme, at the northern termination of this coast, the land is high and bold, some parts attaining an elevation of nearly 2000 feet above the sea. The country on the south-west side of the main bay, as well as that lying to the west of James' Bay, is low and generally level, with shallow water extending a long distance out from shore. Both sides of Hudson's Strait are high and rocky, but the northern is less precipitous than the southern.

Of the numerous rivers which run into Hudson's Bay from all sides, about thirty are of considerable magnitude. All those which enter on the Eastmain Coast appear to flow with a uniform course directly west or parallel to one another, and as the height of land in the centre of the Labrador peninsula is furthest inland towards the south, the rivers which fall into the southern part of this coast are the largest, and the remainder become progressively smaller as we go north. Numerous streams converge to the head of James' Bay from all points southward of an east and west line passing through its southern extremity. The Moose, about a mile wide, is the principal of these. On the western side the Albany and the Churchill are the longest, but the Nelson, with a course of only about 400 miles, discharges the greatest body of water into the sea. Indeed, this great artery of the Winnipeg system may be considered as one of the first class rivers of the world. Few of the rivers of Hudson's Bay afford uninterrupted navigation for large vessels to any great distance from the coast. During the season of high water, shallow-draft steamers might ascend the Moose river and two of its branches for upwards of 100 miles. Hayes river and two of its branches might apparently be navigated by such craft in the spring to points about 140 miles inland, and the Albany for nearly 250 miles; while larger steamers might ascend the Nelson for 70 or 80 miles from the open sea. The Nelson is the only muddy-water river entering Hudson's Bay. Most of the others have a slightly brownish tinge, but their waters are perfectly wholesome and contain only very small quantities of foreign matter. The Churchill, which is the second largest river of Hudson's Bay, is a beautiful clear-water stream, somewhat larger than the Rhine. It is remarkable for having at its mouth a splendid harbour with deep water and every natural convenience for the purposes of modern commerce.

The only harbours on the west side of Hudson's Bay are those formed by the mouths of rivers, but none of them, with the exception of Churchill Harbour, can be entered by vessels drawing more than ten or eleven feet, and only at high water even by these. The Churchill is unlike all the other rivers in having a deep, rocky, and comparatively

narrow mouth, which can be entered with ease and safety by the largest ships at all stages of the tide. On the point at the west side of the entrance of the harbour stands the old Fort Prince of Wales, which is probably the largest ruin in North America. Although occupying a commanding position and mounting about forty large guns, it was surrendered, without firing a shot, to the French Admiral La Pérouse, who destroyed it in 1782.

Along the west coast the rise and fall at spring tides amounts to about 11 or 12 feet, on an average, and is pretty uniform, diminishing somewhat towards the south. It is greatest at the mouth of the Nelson river, where it amounts to about 15 feet. The tides are lower all along the east side of the bay. In Hudson's Strait there is a very good tide, amounting to 38½ feet at Fort Chimo, according to the reports we have received of Acting Staff-Commander J. G. Boulton's reconnaissance during the past summer.

Geologically the basin of Hudson's Bay, excluding the western or Winnipeg division, lies within the great Laurentian area of the Dominion. Silurian rocks resting almost horizontally upon these, form an irregular border along the south-western side of the bay, and in the valleys of some of the rivers they extend inland from 100 to 200 miles. To the south and west of James' Bay, the Silurian are overlaid by Devonian rocks, which here occupy a considerable area. The long chains of islands which fringe the east coast for nearly 300 miles to the northward of Cape Jones, and also the mainland in the vicinity of Richmond Gulf, are composed of igneous and almost unaltered sedimentary rocks, resembling the Nipigon series of the Lake Superior region, which may be of Cambrian age. On the western side of the bay, from Churchill northwards, quartzites and other rocks, which may also belong to the Cambrian system, appear to be largely developed. Valuable minerals may be looked for on this part of the coast. The extensive level region around the south-western side of the bay is overspread with a great sheet of boulder clay, which is generally covered by the modified drift. The rocks of the outlying, or Winnipeg division of the basin, comprise an extensive series, ranging from the Laurentian to the tertiary.

The resources of Hudson's Bay and the country immediately around it are varied and numerous, although as yet few of them are at all developed. The fur trade is the principal and best known business which has hitherto been carried on in these regions, but a large amount of oil, derived from the larger whales, the porpoises, walruses, white bears, and the various species of seals which frequent the northern parts of the bay, has been carried to New England, and small quantities, principally of porpoise and seal oil, have from time to time been brought to London by the Hudson's Bay Company. The other exports from the bay have been as yet but trifling. They embrace whalebone, feathers, quills, castorum, lead ore, sawn lumber, ivory, tallow, isinglass, and skins

of seals and porpoises. The fisheries, properly speaking, of Hudson's Bay have not yet been investigated. Both the Indians and Eskimo find a variety of fish for their own use, and fine salmon abound in the rivers of Hudson's Strait; and from one or two of them a considerable number of barrels, in a salted condition, are exported every year. Waterfowl are very numerous on both sides of the bay, and larger game on the "barren grounds" in the northern parts, so that the natives, with prudence, may always have a plentiful supply of food.

But perhaps the most important of the undeveloped resources of the country around the bay are its soil, timber, and minerals. To the south and west of James' Bay, in the latitude of Devonshire and Cornwall, there is a large tract, in which much of the land is good and the climate sufficiently favourable for the successful prosecution of stock and dairy farming. A strip of country along the east side of James' Bay may also prove available for these purposes. To the south-west of the wide part of the bay the country is well wooded, and although little or no rock comes to the surface over an immense area, still neither the soil nor the climate are suitable for carrying on agriculture as a principal occupation until we have passed over more than half the distance to Lake Winnipeg. This region, however, offers no engineering difficulties to the construction of a railway from the sea-coast to the better country beyond, and this, at present, is the most important point in reference to it. Some of the timber found in the country which sends its waters into James' Bay, may prove to be of value for export. Among the kinds which it produces may be mentioned white, red, and pitch pine, black and white spruce, balsam, larch, white cedar, and white birch. The numerous rivers converging towards the head of James' Bay offer facilities for "driving" timber to points at which it may be shipped by sea-going vessels.

Minerals may, however, become in the future the greatest of the resources of Hudson's Bay. Little direct search has as yet been made for the valuable minerals of these regions. I have, however, found a large deposit of rich ironstone on the Mattagami river, inexhaustible supplies of good manganiferous iron ore on the islands near the East-main coast, and promising quantities of galena around Richmond Gulf and also near Little Whale River, where a small amount had previously been known to exist. I have likewise noted traces of gold, silver, molybdenum, and copper. Lignite is met with on the Missinabe, gypsum on the Moose, and petroleum-bearing limestone on the Abittibi river. Small quantities of anthracite, and various ornamental stones and rare minerals, have been met with in the course of my explorations. Soapstone is abundant not far from Mosquito Bay, on the east side, and iron pyrites between Churchill and Marble Island, on the west. Good building stones, clays, and limestones exist on both sides of the bay. A cargo of mica is said to have been taken from Chesterfield Inlet to

New York, and valuable deposits of plumbago are reported to occur on the north side of Hudson's Strait. Some capitalists have applied to the Canadian Government for mining rights in the latter region.

Situated in the heart of North America, and possessing a seaport in the very centre of the continent, 1500 miles nearer than Quebec to the fertile lands of the North-west Territories, Hudson's Bay now begins to possess a new interest, not only to the Canadians, but also to the people of Great Britain, from the fact that the future highway between the great North-west of the Dominion and Europe may pass through it. The possibility of this route being adopted for trade is not a new idea, as it has frequently been suggested by far-seeing men in past years, and occasionally referred to in the newspapers. In 1848 the then Lieutenant M. H. Synge, in his work on Canada, wrote: "A ship annually arrives at Fort York, for the service of the Hudson's Bay Company; who can tell how many may eventually do so?" In 1869, and subsequently, I frequently discussed the matter with the late Hon. John Young, Mr. Keefer, Professor Armstrong, and others; and in 1876 Mr. Selwyn brought the subject unofficially before members of the Canadian Government, and recommended that surveys be made of Hudson's Bay and Strait. The Right Hon. Sir John A. Macdonald, Minister of the Interior, and his deputy, Colonel J. S. Dennis, have all along taken a deep interest in this question, and in 1878 the latter gentleman published a work, accompanied by a valuable map, in relation to it. The Report of the Minister of the Interior for 1878 contains an appendix by myself on the practicability of building a railway from Lake Winnipeg to Hudson's Bay. In the session of 1878-79, and again the following year, the Hon. Thomas Ryan, a gentleman of great enterprise, has brought the matter under the notice of the Dominion Senate.

In 1880 the Parliament of Canada granted charters to two companies for constructing railways, and otherwise opening a route for commerce, from the North-West Territories to Europe viâ Hudson's Bay; and during the past summer one of them, the Nelson Valley Company, caused a survey to be made of part of the distance between Lake Winnipeg and the harbour of Churchill. Their chief engineer has reported the route to be an easy and inexpensive one for a railway. This company has also the power of connecting with the Canadian Pacific Railway, but the main line will form a connecting link between the great system of inland navigation, which centres in Lake Winnipeg, and the sea. When constructed, the Nelson Valley railway may carry to the seaboard not only the surplus grain and cattle of our own North-West, but also those of Minnesota and Dakota. Sir J. H. Lefroy, President of the Geographical Section of the British Association, in the able address which he delivered at the Swansea meeting (1880), said:— "Hudson's Bay itself cannot fail, at no distant day, to challenge more attention. Dr. Bell reports that the land is rising at the rate of five to

ten feet in a century, that is, possibly, an inch a year. Not, however, on this account will the hydrographer notice it; but because the natural seaports of that vast interior, now thrown open to settlement, Keewatin, Manitoba, and other provinces unborn, must be sought there. York Factory, which is nearer Liverpool than New York, has been happily called by Professor H. Y. Hind the Archangel of the West. The mouth of the Churchill, however, although somewhat further north, offers far superior natural advantages, and may more fitly challenge the title. It will undoubtedly be the future shipping port for the agricultural products of the vast North-West Territory, and the route by which emigrants will enter the country." Sir Henry Lefroy knows whereof he writes, being personally well acquainted with Hudson's Bay and the North-West Territories.

It has been shown that the Canadian North-West Territories, embracing hundreds of millions of acres of fine land, are capable of becoming the greatest wheatfield in the world. The centre of this immense agricultural region probably lies to the north of the Saskatchewan. If we look at the map of the northern hemisphere, we shall see at a glance that the shortest route between these territories and England is through Hudson's Bay. Mr. Lindsay Russell, the Surveyor-General of Canada, has recently made a close calculation of relative distances, and found that even the city of Winnipeg, which is near the south-eastern extremity of these territories, is at least 800 miles nearer to Liverpool by the Hudson's Bay route than by the St. Lawrence, while the difference in favour of the former will be increased continually as we advance northward into the interior. Now let us consider the relative progress of two persons travelling to Liverpool from the centre of this vast region, the one going by Winnipeg and the valley of the St. Lawrence, and the other by the Nelson valley and the Churchill Harbour. In about the same time which the former requires to reach the city of Winnipeg, the latter arrives at the sea-coast at Churchill. From Winnipeg our first traveller has still to go 1291 miles by the Lake Superior route, or 1698 miles if he prefer the all-rail journey through American territory, viâ Chicago, before he reaches Montreal, where he will be still about as far from Liverpool as our other traveller when he has reached Churchill. In other words, the route from the North-West Territories to England, viâ Hudson's Bay, saves the whole distance between Winnipeg and Montreal. The distance to Liverpool by way of New York is still greater. The advantages of this short route over all others are so numerous that only a few of them can be referred to in this short paper. The great saving in distance represents an important economy in time and money, or in freight and passenger rates. If the grain, cattle, and other productions of the North-West Territories could reach a European market, only through Ontario and Quebec, or by way of New York, a large proportion of their value would necessarily be consumed by the

long land carriage; whereas if they can find an outlet at Churchill, there will be an average saving of 1291 miles as compared with Montreal, and of upwards of 1700 miles as compared with New York, and this without any increase in the length of the sea voyage. In effect, this will place a great part of the farming lands of our North-West Territories in as good a position in regard to a seaport as are those of Ontario west of Toronto; and consequently will greatly increase the value of every description of farm produce and, therefore, of the farms themselves. Some kinds, which could not be sent out of the country at all by the longer land route, may be profitably exported by the shorter one. For the transportation of both grain and fresh meat, as Colonel Dennis has pointed out, the northern route, besides the shortening of the distance, would have great advantages over all those to the south, owing to its cooler and more uniform temperature. Heavy or bulky goods of all kinds would, of course, be imported into the North-West by the shortest land route. In regard to the export and import of live stock, this independent route will possess a great importance to these territories. Hitherto cattle, horses, hogs, and sheep have there enjoyed an immunity from almost all forms of contagious diseases, and, owing to the healthy nature of the climate for these animals, it is hoped this state of things will continue. The domestic animals in the United States and the older Canadian provinces being occasionally afflicted with contagious diseases, it becomes necessary for European countries to impose restrictions on their importation. In the event of an epidemic of this nature existing in some part of these regions, but not in the North-West Territories, there need be no objection to exporting live stock from the latter by way of Hudson's Bay.

As a route for emigrants from Europe, that by Hudson's Bay possesses not only the advantage of the short land journey, but the still more important one to us, of entirely avoiding the United States and the populous parts of Canada, in both of which, it is well known, a very serious percentage of the immigrants destined for our North-West lands are every year enticed away to settle in the great republic. An inlet by Hudson's Bay is the only thoroughly independent channel which can ever be established between the British Islands and our great and valuable territories in the interior of North America; and it is very desirable, on national grounds, that it should be opened up. Troops have hitherto been sent to the Red River settlement on more than one occasion, by way of Hudson's Bay, while the intervening country was, as it is yet, in a state of nature. Were a short railway built through this tract, it would at once become, for military purposes, an easy connecting link with the mother country.

An impression has long prevailed that Hudson's Bay and Strait could not be navigated for the ordinary purposes of commerce on account of ice, but this idea is probably destined to prove chimerical. The occasion

for testing the point had not hitherto arisen, and the fact that these waters have been successfully navigated by ordinary sailing vessels for 200 years, in order to secure what little trade the country afforded, indicates what may be expected from properly equipped steamships, so soon as the larger business of the future may require their services in this direction. The conditions of the sea-borne commerce of the North-West, in relation to Hudson's Bay, will probably turn out to be similar to those of the rest of Canada with reference to the Gulf of St. Lawrence. In both cases, everything must be done during the summer. Yet Hudson's Bay is, of course, open all the year round. No one would be likely to suppose that a sea of such extent, in the latitude of the British Islands, would ever freeze across. The Lower St. Lawrence is also partly open even in the middle of winter. But the difficulty in both cases is the impossibility of getting into harbours. A harbour such as that of Churchill on Hudson's Bay would have the advantage over Quebec or Montreal of communicating directly with the open sea, and hence in the autumn, vessels would not be liable to be frozen in, as occasionally happens in the St. Lawrence, as for example in the autumn just passed; and also in the autumn of 1870, when the outward-bound shipping got frozen in below Quebec, occasioning a loss, it was said, of over a million of dollars. Again, in the spring there would probably be less uncertainty about entering from sea than in the Gulf of St. Lawrence, where vexatious delays are not uncommon after the open season is supposed to have arrived.

There has been some discussion as to the length of time during which Hudson's Strait and Bay might be navigated each year, but there does not seem to be much evidence that the strait, any more than the bay, is closed at any season. Its great width, depth, and the strength of the tides probably keep it open all winter. My own experience and that of many others lead me to believe that the climate generally of Hudson's Bay is much better than some writers have represented it to be. From all that I could learn or observe, it appears that the strait and bay may be navigated and the land approached by steamers during an average of four and a half months each year, or from the middle of June to the end of October. The strait and bay could probably be navigated by steam-vessels earlier than the middle of June, but nothing would be gained, except perhaps by whalers, in going in before an open harbour can be reached. Much has been recorded in favour of the above opinion from the days of the Danish Captain John Monck, who wintered at Churchill in 1619–20, to the present time; and other evidence, which is not to be found in the books, leads me to the same conclusion. Churchill Harbour does not freeze up until November, and the sea is open close to it during the whole winter.

I have a record of the principal phenomena of the seasons at Martin' Falls, on the Albany, extending through a period of fifty years, and from

it I find that the river is open there on an average for six months of the year. I have also a record of the dates of the opening and closing of Hayes river at York Factory, extending over more than fifty years, from which it appears to enjoy an average of fully six months of open water. The Nelson river is open for a longer period. I think, with these facts before us, we need not despair of successfully navigating Hudson's Bay, as far as the length of the season is concerned. Even were the time of open navigation shorter than it is known to be, the very great benefits which the North-West and Canada generally would derive from possessing an outlet in that direction, are sufficient to make it well worth an effort to open it up. The freedom of Hudson's Strait and Bay from rocks, shoals, and other impediments to navigation will exempt vessels in that quarter of the globe from the heavy expenses for pilots, lighthouses, &c., which burden shipping by the St. Lawrence, and are even more onerous in some other parts of the world. The delays from drifting ice in the strait which have occasionally occurred to sailing vessels would not be experienced by steamships.

We have seen that in proportion as we decrease the cost of transportation to a foreign market, we increase the home value of all kinds of farm produce, and consequently of the farm itself. Now, considering the vast extent of fine land to be affected by the opening of the route above referred to, if the value of each acre of it were enhanced in this way by only a few shillings, the aggregate increase would amount to more than a hundred millions of dollars. Such a gain as this, together with the various other great advantages which, as we have seen, may be derived from the opening of this new ocean route, will, I think, sufficiently illustrate the commercial importance of Hudson's Bay.

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MAP OF HUDSON BAY and part of THE DOMINION OF CANADA

to accompany the paper by Robert Bell, M.D., F.G.S.
Assistant Director of the Geological Survey of Canada.

Compiled from the latest Surveys

SCALE OF ENGLISH STATUTE MILES
10 0 10 20 30 40

The heights are expressed in feet above the Sea Level, thus 598
The soundings are expressed in fathoms (of 6 feet) thus. 173

Distances.
From Fort York (Hudson Bay) to Liverpool, 2966 Geogr. Miles
From New York to Liverpool, via Tory Island, 2987 " "
From New York to Liverpool, via Cape Clear, 3029 " "

Abbreviations

B.	Bay	Hd	Head	Lr.	Lower.
C.	Cape	Hr	Harbour	Pt	Point
Cr	Creek	Ho	House	R	River
Fd	Fiord	Is	Islands	Str	Strait
Ft	Fort	L.	Lake	Up!	Upper

DIAGRAM
showing the Route between
FORT YORK, HUDSON BAY
and
LIVERPOOL

Fort York to Liverpool 2966 Geogr. Miles

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